Name:

at1124exam: Radicals and Squares (v808)

Question 1

Simplify the radical expressions.

$\sqrt{18}$ $\sqrt{20}$ $\sqrt{63}$

$\sqrt{3 \cdot 3 \cdot 2}$ $\sqrt{2 \cdot 2 \cdot 5}$ $\sqrt{3 \cdot 3 \cdot 7}$

$3\sqrt{2}$ $2\sqrt{5}$ $3\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$\frac{(x-7)^2}{4} - 8 = 17$$

First, add 8 to both sides.

$$\frac{(x-7)^2}{4} = 25$$

Then, multiply both sides by 4.

$$(x-7)^2 = 100$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 7 = \pm 10$$

Add 7 to both sides.

$$x = 7 \pm 10$$

So the two solutions are $x = 17$ and $x = -3$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 12x = 85$$

$$x^2 - 12x + 36 = 85 + 36$$
$$x^2 - 12x + 36 = 121$$
$$(x-6)^2 = 121$$
$$x - 6 = \pm 11$$
$$x = 6 \pm 11$$
$$x = 17 \quad \text{or} \quad x = -5$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 + 24x + 75$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 12x) + 75$$

We want a perfect square. Halve 12 and square the result to get 36 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 12x + 36 - 36) + 75$$

Factor the perfect-square trinomial.

$$y = 2((x+6)^2 - 36) + 75$$

Distribute the 2.

$$y = 2(x+6)^2 - 72 + 75$$

Combine the constants to get **vertex form**:

$$y = 2(x+6)^2 + 3$$

The vertex is at point $(-6, 3)$.